**Analysis of Barrio Logan's Biodiesel Plant Failure**

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science in Chemical Engineering

**Carson Min**

Spring 2025

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

ADVISOR

Kent Wayland, Department of Engineering and Society

## Introduction

In 2024 alone, the United States experienced 27 different climate disasters, each costing around $1 billion (NOAA, 2025). This influx in natural disasters could be attributed to many factors, including the rising global temperature (Vernick, 2025). Greenhouse gas emissions are a leading cause of global climate change, and modern day energy technologies are contributing to the emissions. Growing demands for energy in developing countries alongside the global climate crisis place an emphasis on a need for cleaner fuel sources in comparison to traditional fossil fuels. However, global infrastructure and technologies are not ready to support a radical change to fully renewable energy sources like solar or wind. An existing solution to this problem can be found in biofuels.

Biofuels have “the potential to cut greenhouse gas emissions by 86%” (U.S. DEPARTMENT OF ENERGY, n.d.), they are compatible with gasoline infrastructure and can be used to power modern day internal combustion vehicles. These fuels are generated by converting natural, renewable feedstock into a liquid fuel source. The process is less carbon intensive than refining petroleum and the fuel burns cleaner than current options, showing that biofuels provide an environmentally friendly alternative that does not require immediate change or investments by mitigating a traditionally greenhouse gas intensive process while preserving utility. Despite the positives surrounding biofuels, its production and use is not popular within the current US population.

The US opened its first biofuel production plant in 1991 in Kansas City, Missouri, beginning the nation’s interest in the fuel source. However, the production of biofuels did not gain traction until the early 2000’s, when tax credits were introduced for all producers. Despite the backing from the US government, the biofuel production plants have faced backlash due to

"food vs fuel" arguments and NIMBYism (Not In My BackYard). The efforts of local communities have stalled or canceled multiple biofuel plants across the country (Energías Renovables, 2013). Yet, the pressing need for climate conscious fuel sources indicates that biofuel production needs to start as soon as possible. This begs the question, "*What can be learned about betting implementing biofuel plants into local communities from the case of New Leaf Biofuel in Barrio Logan?"*. To answer this question, this STS paper will aim to understand the evolving sociotechnical system that is developed between a community and a biofuel production plant.

**Background and Context**

California has long been a leader in the US's effort for climate change and clean energy, having its first clean energy bill be enacted in 2002 (Farber, 2024). These efforts are reflected in the in the 38% of California's energy that is sourced from renewable technologies (California Energy Commission, 2023). A portion of this renewable energy comes from biofuels sources. New Leaf Biofuel is a biofuel producer that was located in San Deigo, California's Barrio Logan neighborhood, a community which is known for its art and shared Hispanic culture, being designated as one of California's "14 Cultural Districts" ("Barrio Logan"). From 2006 to 2023, New Leaf Biofuel operated a biofuel plant within the community, which processed 'used cooking oil' as a feedstock.

The process of generating fuel is accomplished via fermentation, where bacteria convert sugar into combustible fuels. This process can be applied to multiple feedstocks, offering interesting value in converting what can be seen as "waste streams" to something useful.

However, the process of fermentation can lead to side products like hydrogen sulfide, aldehydes, and sulfur compounds, all of which are associated with rotten scents. These scents can cause a nuisance for workers and community members alike, disrupting the natural harmony of a community. In the case of New Leaf Biofuel's plant, side products were commonplace in their process, primarily due to the used cooking oil feedstock. Many complaints from local community members regarding health effects were filed with official California state environmental agencies enacting change that led to the eventual halting of operation in New Leaf Biofuel's production plant. New Leaf Biofuels claimed, "economic conditions" and "heavy regulatory and neighborhood pressures" (Anderson, 2023) as the main reasons for shutting down, yet this research paper aims to dive deeper into the New Leaf Biofuel and Barrio Logan situation to further understand its sociotechnical system.

To analyze this sociotechnical system, Callon and Law's framework of Actor Network Theory (ANT), as described in "Some Elements of a Sociology of Translation" (Callon, 1986), will be used to set boundaries for deeper and concrete analysis. ANT claims that everything, including humans, objects, ideas, and technologies are "actors" within a network. The interactions of these actors shape the sociotechnical system as whole. Specifically, ANT utilizes the concepts of enrolment, the process of bringing other actors into a network, and translation, the process of persuading actors to act in a certain way, to define how these networks are formed and how actors can influence each other. The actors being studied in this particular system include: Californian Government and Regulatory Bodies, Barrio Logan residents, the Environmental Health Coalition, New Leaf Biofuel, and the Physical Plant itself.

## Methods

In order to properly analyze the sociotechnical system of New Leaf Biofuel's production plant and the Barrio Logan community, a case study was conducted. Evidence for this case study was selected with the goals of generating a proper timeline of events and reflecting the opinions and actions of each actor across a timeframe of 2006 – 2024. Pieces of evidence include local news reports, San Deigo Air Pollution Control District documents, public statements, filed dockets, and New Leaf statements.

The collection of evidence was done rigorously and systematically. For each event, multiple sources were analyzed and cross-checked for a consistent retelling of history. To further reduce confirmation bias, every relevant source was distilled into bullet points to reflect only the most critical information. Only after these two steps were completed was information formulated into the case study.

## Results

For 17 years New Leaf Biofuels was under operation within the city of San Diego. And for the entirety of its existence, the company had been at qualms with the local citizens of Barrio Logan. Citizens cited a strong odor and health effects as a direct result of New Leaf Biofuels' operations.

***Timeline of events:***

1980 – Environmental Health Coalition was formed in San Diego (*Our Story*, n.d.)

2002 – State of California signs its first renewable energy bill

2006 – New Leaf Biofuels purchases site and begins operations in San Diego

2008 – New Leaf Biofuel is awarded a grant, tripling production from 500,000 Gallons to 1.5 millions of gallons per year (MMgy) (Kotrba, 2019)

2012 – New Leaf Biofuel awarded a state grant expanding from 1.5 to 5 MMgy

2017 – New Leaf Biofuel awarded another state grant and expands to 12 MMgy

2020 – New Leaf Biofuel submits two formal dockets to the California Energy Commission

2021 - Barrio Logan began filing Formal Complaints Residents

2022 - APCD filed a lawsuit against NLB and ordered an odor reducing system

2022 - Residents signed a petition to force New Leaf Biofuel to shut down instead of continuing operations

2023 - New Leaf Biofuels tries to remove the truck production and implement a underground piping system

2023 – Barrio Logan Residents vote against New Leaf Biofuel and force the company to shut down operations

One significant component of ANT is Enrollment, which describes how actors are brought into the network. The initial actors of this network were the Local Residents and the California government, which were established with the creation of Barrio Logan itself in the early 1900s. The next actor to join the network was the Environmental Health Coalition (EHC), a group comprised of local residents formed in 1980. The initial 3 actors all joined the network willingly, and were able to function in harmony as their goals of living in a peaceful environment were aligned. While the final two actors of New Leaf Biofuel and the physical plant itself joined in 2006.

The second significant component of ANT is Translation, a concept that describes how the actions of one actor can influence another. When the EHC was formed in 1980, it drew residents of the Barrio Logan community together to face environmental injustices and protect their community. The creation of the EHC alone was able to give more power to the Bario Logan citizens, and provide an entity for the California Government to respond to.

While in 2002 when the California Government clean energy bill was signed, multiple renewable energy companies were brought into the state. By offering tax credits to any companies helping to combat climate change, multiple new actants could have joined the network. Similar to the initial clean energy bill, the California Government offered multiple grants which were awarded to New Leaf Biofuel in the years 2008, 2012, and 2017. These actions indicated California's opinion on renewable energies and enabled companies like New Leaf Biofuel to join and thrive within the sociotechnical network. The three grants New Leaf Biofuel were awarded went towards expanding their own operations. With every expansion the Barrio Logan citizens and the EHC expressed disapproval.

A fourth expansion was proposed from New Leaf Biofuel to the California government in 2020, as the company submitted two separate dockets, which aimed to increase locality in sourcing renewable energy and expand their own operations (California Energy Commission, 2023). In response, the California Government approved of the plans, but the talks of expansion were not well received by Barrio Logan residents.

For years citizens argued that New Leaf Biofuel was harming their livelihood. Citing strong, bitter odors, that caused headaches, nausea, and irritation in their throats and eyes (Estrada, 2022). While the community stood by during the initial three expansions, in the year 2021, after New Leaf Biofuel's proposed fourth expansion, the community had enough. Local citizens began filing formal complaints to the San Diego Air Pollution Control District, urging the group to prevent New Leaf Biofuel from operating until the "noxious odor" were under control (Estrada, 2022). Equipped with formal complaints, the Air Pollution Control District conducted over 45 inspections, finding New Leaf Biofuels in violation of District Rule 51, "Nuisance", and California Health and Safety Code section 41700 (Rodriguez et al., 2023) which both detail air pollution regulations and guidelines. New Leaf Biofuel was formally served a Stipulated Abatement Order which necessitated proper housekeeping of all ancillary equipment and the installation of an odor reduction control system (Rodriguez et al., 2022).

By early 2023 New Leaf Biofuel was compliant with San Diego Air Pollution's rulings and had an operational odor reduction system. Some local residents responded positively to the changes, stating "our family is hanging out in the yard more and I feel like, in a lot of ways we got our neighborhood back!" (Acre, 2023), while others found that necessitating an odor control system was a wakeup call as questioned if "a heavy industrial biodiesel production plant in the middle of a residential neighborhood" was a good thing (Anderson, 2023).

Despite having an odor control system, residents were still experiencing emitted odors. The source of these odors was found to be the loading and unloading of used cooking oil from delivery trucks. New Leaf Biofuels proposed a solution for this issue to the city of San Diego in 2023, via an implementation of an underground pipeline project. The project was meant to solve two problems at once, firstly it would reduce road traffic by removing the need for trucks and secondly it would get rid of the release of odors (Alvarenga, 2023). The underground pipeline project was initially approved by the city council, but was later appealed by the Barrio Logan planning committee.

When local residents and the Barrio Logan planning committee first heard about another project, initial worries were expressed about New Leaf Biofuels cementing its place within the neighborhood (Alvarenga, 2023). In response to the community's outcry, New Leaf Biofuel's CEO Jennfier Case, attended a planning committee meeting to have a discussion. Case stated that the project's aim was to reduce current pollution and impact on the community, not to expand operations. However, the many previous actions of New Leaf Biofuel and subsequent air pollution made up the minds of residents, who called for them to "close up shop entirely" (Alvarenga, 2023). Due to the pushback from the local community and regulatory pressures, New Leaf Biofuels shut down their operations.

**Discussion / Analysis**

In general, this case study describes a sociotechnical system that resulted in failure. Between the years 2006 and 2017, it seems as though the network of actors were able to function in a respectable manner. New Leaf Biofuel offered a clean alternative that was effectively helping the community, the local residents did not publicly oppose the company, and

governmental bodies were in support for them, yet the plans for further expansion changed everything. As a direct result of announcing the fourth expansion, Barrio Logan citizens introduced a new actor, the San Diego Air Pollution Control District, and enabled them to act in the form of the Stipulated Abatement Order. Because the actions of New Leaf Biofuels were not able to meet the wants and needs of other actors, the network as a whole failed, despite being compliant with the other major actor in network. Additionally, the act of proposing the underground pipeline project had a similar response from the Barrio Logan citizens. Again New Leaf Biofuel was trying to advance the success of their company without meeting the needs of all the other actors in the network. This constant misalignment in goals between actors, and the negative effects associated with New Leaf Biofuel operations were the cause of the network's failure. The aftereffects of the network's failure are still being felt today, as Barrio Logan citizens are weary of new biofuel production and New Leaf Biofuel is looking for a new location to begin business.

The format of this case study was supported and framed via Actor Network Theory. By doing so the case study was able to actively define how a sociotechnical network is formed, who it is comprised of, and how the actors involved interact with each other. This case study had a few limitations, namely a lack of resources. Despite finding court rulings, news articles, and public statements, town hall notes and the specific opinions of outspoken citizens were not able to be found.

**Conclusion**

Global demand for energy continues to grow as countries develop modern day technologies that require electricity. This demand calls for action in regard to carbon dioxide emissions and the ever-present threat of climate change. To mitigate future carbon dioxide releases, alternatives to traditional oil and gas energy sources need to be explored. One option that is more environmentally friendly than modern day sources and compatible with current infrastructure is liquid biofuels. However, these biofuels require production plants that can disrupt the local communities they are implanted into. New Leaf Biofuels in Barrio Logan is one example of a production plant failing.

New Leaf Biofuels is an example and reminder for all biofuel production companies planning to open in the coming years to consult the local community and other actors/stakeholders. The events which occurred in Barrio Logan, California example one of many production plants that have lost the trust of their communities, ultimately losing the right to operate. Further improvements to this study could be accomplished via visiting the Barrio Logan site itself and conducting interviews / reading and analyzing town hall documents to have a better understanding of the injustice occurring in Barrio Logan.

## References


ABC 10 News. (2024, August 22). *Report: Fewer odors at Biofuel Plant*. YouTube. https://www.youtube.com/watch?v=QpKrdLZLHQs

Alvarenga, E. (2023, August 18). *"It's time to go": In Barrio Logan, controversial pipeline plans prompt new calls for a biodiesel plant to close*. San Diego Union-Tribune. https://www.sandiegouniontribune.com/2023/08/18/its-time-to-go-in-barrio-logan-controversial-pipeline-plans-prompt-new-calls-for-a-biodiesel-plant-to-close/

Anderson, E. (2023a, October 4). *San Diego biodiesel plant still stirring up opposition from Barrio Logan neighbors*. KPBS Public Media; KPBS. https://www.kpbs.org/news/environment/2023/10/04/san-diego-biodiesel-plant-still-stirring-up-opposition-from-barrio-logan-neighbors

Anderson, E. (2023b, October 20). *Controversial Barrio Logan plant stopping biodiesel operations*. KPBS Public Media; KPBS. https://www.kpbs.org/news/environment/2023/10/20/controversial-barrio-logan-plant-stopping-biodiesel-operations

Arce, T. (2023, February 8). *Barrio Logan Residents Breathe Easier with the Installation of an Odor Control System*. Environmental Health Coalition. https://www.environmentalhealth.org/2023/02/08/barrio-logan-residents-breathe-easier-with-the-installation-of-an-odor-control-system/

*Barrio Logan*. (2019). Sandiego.org. https://www.sandiego.org/articles/downtown/barrio-logan.aspx

California Energy Commission. (2023). *2023 Total System Electric Generation*. California Energy Commission. https://www.energy.ca.gov/data-reports/energy-almanac/california-

electricity-data/2023-total-system-electric-generation

Callon, M. (1986). *Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St. Brieuc Bay* (J. Law, Ed.; pp. 196–233)) [Review of *Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St. Brieuc Bay*].

Energías Renovables. (2013, August 30). *Biofuel must battle NIMBYism with better tactics*. Renewable Energy Magazine, at the Heart of Clean Energy Journalism. https://www.renewableenergymagazine.com/Al_Maiorino/biofuel-must-battle-nimbyism-with-better-tactics-20130830

Engleman, S., Gonzalez, J., & Schlick, A. (2024). *STATEMENT OF PROCEEDINGS SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT HEARING BOARD*. https://www.sdapcd.org/content/dam/sdapcd/documents/hearing-board/sop/2024/03-21-24/03.21.24%20SOP%20Draft.pdf

Estrada, A. (2022, October 24). *Barrio Logan Activists Demand a Stop to New Leaf Biofuel's Putrid Smell*. Environmental Health Coalition. https://www.environmentalhealth.org/2022/10/24/barrio-logan-activists-demand-a-stop-to-new-leaf-biofuels-putrid-smell/

Farber, D. (2024, February 21). *California's Climate Leadership: A Timeline*. Legal Planet. https://legal-planet.org/2024/02/21/california-climate-laws-a-timeline/

Kotrba, R. (2019, January 1). *The Perpetually Expanding Veteran Startup | Biodiesel Magazine*. Biodieselmagazine.com. https://biodieselmagazine.com/articles/the-perpetually-expanding-veteran-startup-2516538

Mary, M. (2022, October 31). *SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT*

*HEARING BOARD BOARD ORDER*. https://www.sdapcd.org/content/dam/sdapcd/documents/hearing-board/sop/2022/10.27.22%20SOP%20Draft.pdf

Montoya, R. (2024, January 12). *What Is the Percentage of Electric Cars in the U.S.?* Edmunds. https://www.edmunds.com/electric-car/articles/percentage-of-electric-cars-in-us.html

NOAA. (2025). *Billion-Dollar weather and climate disasters | national centers for environmental information (NCEI)*. Www.ncei.noaa.gov. https://www.ncei.noaa.gov/access/billions/

*Our story*. (n.d.). Environmental Health Coalition. https://www.environmentalhealth.org/about/our-story/

Rodriguez, V., Schlick, A., Engleman, S., Gonzalez, J., Powers, W., & Spencer, D. (2023). *STATEMENT OF PROCEEDINGS SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT HEARING BOARD*. *22*, 2023–2024. https://www.sdapcd.org/content/dam/sdapcd/documents/hearing-board/sop/2023-sop/06-22-23/06.22.23%20SOP%20Final.pdf

Small, M. (2024, August 23). *Report: Fewer odors at Barrio Logan biofuel plant*. ABC 10 News San Diego KGTV. https://www.10news.com/news/local-news/report-fewer-odors-at-barrio-logan-biofuel-plant

Taylor-Powell, E., & Renner, M. (2003). *Analyzing Qualitative Data*. UW Extension.

U.S. DEPARTMENT OF ENERGY. (n.d.). *Biofuels & Greenhouse Gas Emissions: Myths versus Facts*. https://www.energy.gov/articles/biofuels-greenhouse-gas-emissions-myths-versus-facts-0

Vernick, D. (2025, January 14). *Is Climate Change Increasing the Risk of Disasters?* World

Wildlife Fund; WWF. https://www.worldwildlife.org/stories/is-climate-change-increasing-the-risk-of-disasters